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Water Supply Outlook for Arizona

Federal-State-Private Cooperative Snow Surveys



JAN. 1, 1984

Issued by

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COVER PHOTO -
Spring is on the way



JANUARY-MAY FORECASTS CALL FOR VARYING
WATER SUPPLY CONDITIONS IN ARIZONA

WATER SUPPLY

The first forecasts of 1984 indicate that water supplies may vary in Arizona depending on the water users' primary source. No serious shortages are expected at this date and water conditions may improve as winter progresses. Major reservoirs have abundant storage, but streamflow is forecast to be below average over the January-May period. The Verde River is forecast at 57% of average, Tonto Creek at 88%, and the Salt River at 72% of average flow. Inflow to the Salt River Project system is forecast to be 596,000 acre-feet. The San Francisco River at Clifton is forecast to produce 74% of average discharge. The Gila River is expected to run 71% of average at Virden, New Mexico and 70% at the Head of Safford Valley. Inflow to the San Carlos Reservoir at Calva is forecast to be 88,000 acre feet or 56% of normal. The upper Little Colorado River should produce about 70% of average streamflow.

SNOW COVER

The Arizona snow pack is near normal for January 1, but only about half what it was a year ago. Snow water equivalent is 92% of average on the Verde River drainage, 109% on the Salt River watershed, 120% on the upper Little Colorado River, and 114% on the Gila-San Francisco drainage.

PRECIPITATION

Heavy rain in late September and early October produced disastrous flooding in Arizona. From mid-October to late November several storms crossed the state, but precipitation was localized and not heavy in most cases. A major storm during the Thanksgiving period produced abundant precipitation and was responsible for most of the snow which still remains in the high country. More precipitation was received in late December. November-December precipitation ranged from 89% to 149% of average at Snotel sites in Arizona and southwestern New Mexico.

STREAMFLOW

Streamflow volumes fluctuated widely during the October-December period. Record flooding occurred in October, primarily in southeastern Arizona. Streams quickly dropped to more nearly normal flows by November, then rose again in December. The Salt River Project released 465,000 acre-feet into the Salt River in October and 106,650 acre-feet in December. Streamflow for the October-December period is represented in the following table:

Stream	1983 Flow = % of Average		
	Oct	Nov	Dec
Salt River	838	117	156
Tonto Creek	324	112	186
Verde River	321	72	156
San Francisco-Glenwood	1978	138	---
San Francisco-Clifton	1694	155	72
Gila at Gila	624	100	---
Gila at Virden	702	135	143
Gila at Solomon	1498	151	113
Gila at Calva	2369	277	---

RESERVOIR STORAGE

Water storage in major reservoirs was at high levels on January 1. The six reservoirs of the Salt River Project had a combined storage of 1,717,000 acre-feet at 85% capacity. San Carlos was 98% full with 921,000 acre-feet. Lake Pleasant held 128,000 acre-feet at 81% of capacity. Painted Rock Dam held 149,000 acre-feet as a result of releases into the Salt River. On the Colorado River, combined storage in the four large reservoirs was 49,620,000 acre-feet or 94% of capacity. Releases are continuing on the Colorado River due to the snow pack accumulation in the upper Colorado Basin.

STREAMFLOW FORECASTS ARE COORDINATED BETWEEN THE
SOIL CONSERVATION SERVICE AND NATIONAL WEATHER SERVICE.
AVERAGES OF STREAMFLOW, SNOW PACK, PRECIPITATION, AND
RESERVOIR STORAGE ARE BASED ON THE 20-YEAR PERIOD 1961-80

ABOUT JANUARY
STREAMFLOW FORECASTS 1, 1984

BASIN, STREAM and/or FORECAST POINT	THIS YEAR		PAST RECORD		
	FORECAST		FORECAST PERIOD	THOUSAND ACRE FEET	
	Thousand Acre Feet	Percent of Average		Last Year	Average +
<u>SALT RIVER DRAINAGE</u>					
Salt near Roosevelt	335	72	Jan-May	1,004	466
"	45	85	January	71.9	52.7
Tonto Creek near Roosevelt	85	88	Jan-May	223	96.8
"	18	90	January	25.6	20.0
Verde River above Horseshoe	176	57	Jan-May	620	30.9
"	26	54	January	44.8	48.5
Total Salt River Project Streams	596	68	Jan-May	1,847	871
"	89	73	January	142.3	121.2
<u>GILA RIVER DRAINAGE</u>					
Gila River at Calva	88	56	Jan-May	545	156
Gila River near Gila	53	77	Jan-May	156	69
Gila River near Solomon	140	70	Jan-May	588	200
"	25	73	January	39.4	34.4
Gila River near Virden	65	71	Jan-May	231	92
Frisco River at Clifton	70	74	Jan-May	260	94
Frisco River at Glenwood	28	68	Jan-May	112	41
<u>LITTLE COLORADO RIVER DRAINAGE</u>					
Little Colo. River above Lyman Dam	10.0	70	Jan-June	---	14.2
Greer	6.0	68	Jan-June	---	8.8
<u>GRANITE CREEK DRAINAGE</u>					
Granite Creek	1.0	--	Jan-May	---	---
Willow Creek	0.8	--	Jan-May	---	---
<u>MIMBRES RIVER DRAINAGE</u>					
Mimbres River near Mimbres	4.0	74	Jan-May	12.2	5.4
<u>COLORADO RIVER DRAINAGE</u>					
Virgin River near Littlefield	85	138	Apr-June	253	61.5
Lake Mary Inflow	2.0	--	Jan-May	---	---

* Based on 20-year period, 1961-80
* Average for less than 20 years

RESERVOIR STORAGE (Thousand Acre Feet) January 1, 1984

BASIN or STREAM	RESERVOIR	Usable Capacity	Usable Storage		
			This Year	Last Year	Average+
<u>GILA RIVER DRAINAGE</u>					
Agua Fria	Lake Pleasant	157.6	128	119	67
Granite	Watson Lake	4.7	4.4	4.5	2.2
Granite	Willow Creek	6.1	6.1	3.6	2.1
Gila	San Carlos	935.1	921	153	233
Gila	Painted Rock Dam	2,492	149	10.5	---
Salt (4)	Roosevelt, Apache, Canyon & Saguaro	1,709	1,507	1,445	1,115
Verde (2)	Bartlett & Horseshoe	309.6	210	185	108
Salt and Verde	6 Salt River Project Reservoirs	2,019	1,717	1,630	1,223
<u>COLORADO RIVER DRAINAGE</u>					
Colorado	Lake Havasu	619.4	529	535	546
Colorado	Lake Mohave	1,810	1,654	1,643	1,605
Colorado	Lake Mead	26,159	24,761	24,163	18,176
Colorado	Lake Powell	25,002	22,675	22,604	12,625
Little Colorado	Lyman	**	---	---	---
Little Colorado	Show Low Lake	5.1	4.5	1.3	---
* Based on 20-year average, 1961-80					
* Average is for less than 20 years of record					
** Siltation has reduced the storage capacity of Lyman Reservoir. No storage					
will be reported until new storage tables are completed					

SUMMARY of SNOW MEASUREMENTS (COMPARISON WITH PREVIOUS YEARS) ABOUT JANUARY 1, 1984

RIVER BASIN and/or SUB-WATERSHED	Number of Courses Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
Gila	10	58	114
Salt	10	54	109
Verde	10	50	92
Little Colorado	5	69	120

SNOW ABOUT JANUARY 1, 1984

DRAINAGE BASIN and/or SNOW COURSE		Date of Survey	THIS YEAR		PAST RECORD	
NAME	Elevation		Snow Depth (inches)	Water Content (inches)	Water Content (inches)	Last Year
GILA RIVER						
Bear Wallow	8100		DISCONTINUED			
Beaver Head	8000	1/5	8	2.8	4.5	2.0E
Coronado Trail	8400	1/5	8	2.4	4.8	2.2E
CORONADO TRAIL SNOTEL	8400	1/1	---	2.2	3.9	1.9**
Emory Pass No. 2 *	7800	12/29	2	0.4	3.0	1.3E
Frisco Divide	8000	12/28	5	1.0	3.2	2.0E
FRISCO DIVIDE SNOTEL	8000	1/1	---	2.7	4.0	1.0**
Hannagan Meadows *	9090	1/5	31	5.3	11.5	3.8E
HANNAGAN MEADOWS SNOTEL	8960	1/1	---	8.0	11.9	3.8E
Hummingbird (A)	10550	12/28	41	8.2	10.6	---
LOOKOUT MOUNTAIN SNOTEL	8150	1/1	---	3.1	5.1	---
McKnight Cabin * (A)	9300	12/28	29	6.4		2.8E
Mogollon	7000		NOT SCHEDULED		---	---
Nutrioso	8500	1/5	5	1.9	2.8	1.5E
Redstone Trail	8600		NOT SCHEDULED		---	4.6E
Rose Canyon	7300		DISCONTINUED			
SIGNAL PEAK SNOTEL	8360	1/1	---	3.2	5.4	---
Silver Creek Divide	9070		NOT SCHEDULED		---	6.0E
SILVER CREEK SNOTEL	9070	1/2	---	8.3	9.6	6.0E
State Line	8000	12/28	4	1.1	3.3	1.8E
Whitewater (A)	10750	12/28	44	8.8	13.6	9.0E
VERDE RIVER						
Baker Butte	7330	12/28	6	2.1	5.6	3.1**
BAKER BUTTE SNOTEL	7330	1/1	---	2.3	7.2	3.6**
Baker Butte No. 2	7700	12/28	16	5.7	11.6	4.7**
Camp Wood	5700		DISCONTINUED			
Chalender *	7100	12/29	2	0.4	1.6	1.5**
Copper Basin Divide	6720	12/29	T	0.0	1.0	1.7**
Fort Valley	7350	12/29	3	0.6	3.4	0.8E
FRY SNOTEL	7200	1/1	---	1.8	3.5	3.6**
Gaddes Canyon	7600	12/28	5	1.1	5.7	3.0E
Happy Jack	7630	12/29	9	3.4	4.8	2.1
Iron Springs *	6200		DISCONTINUED		0.6	
Mingus Mountain	7100	12/28	0	0.0	1.2	0.4E
Mormon Lake *	7350	12/29	5	1.8	3.8	3.0E
Mormon Mountain	7500	12/29	11	4.9	5.9	3.8**
MORMON MOUNTAIN SNOTEL	7500	1/1	---	2.9	6.2	4.1
Mormon Mtn. Summit #2	8470		NOT SCHEDULED		---	---
Newman Park	6750	12/29	1	0.5	1.5	1.4**
Snow Bowl #1 Alternate	9920	12/29	30	7.4	11.0	5.0E
Snow Bowl #2	11000	12/29	38	9.5	15.6	7.4E
SUGAR LOAF SNOTEL	6120	1/1	---	1.9	---	---
White Horse Lake Jct.	7180	1/3	T	0.1	3.1	1.4**
WHITE HORSE SNOTEL	7180	1/2	---	1.4	6.7	3.0**
White Spar	6000		DISCONTINUED		0.9	

SNOW ABOUT JANUARY 1, 1984

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR			PAST RECORD	
		Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year	Average +
SALT RIVER						
Baldy *	9220	12/29	22	4.9	7.2	4.0
BALDY SNOTEL	9220	1/1	--	5.5	8.3	4.4**
Beaver Head	8000	1/5	8	2.8	4.5	2.0E
BONITA ROCK SNOTEL	8270	DISCONTINUED			8.2	
Canyon Creek	7500	12/28	8	1.8	3.7	2.5
Canyon Point	7600	12/28	8	1.5	4.1	3.5**
Coronado Trail	8400	1/5	8	2.4	4.8	2.2E
CORONADO TRAIL SNOTEL	8400	1/1	--	2.2	3.9	1.9**
Forest Dale Alternate	6580	12/29	1	0.2	0.2	1.0E
Ft. Apache	9160	12/29	23	4.9	7.1	4.3E
Hannagan Meadows	9090	1/5	31	5.3	11.5	3.8E
HANNAGAN MEADOWS SNOTEL	8960	1/1	--	8.0	11.9	3.8E
Hawley Lake	8250	DISCONTINUED				
HAWLEY LAKE SNOTEL	8250	DISCONTINUED				
Heber	7640	12/28	8	2.6	3.9	1.9
HEBER SNOTEL	7640	1/1	--	3.8	3.4	2.3**
Maverick Fork	9050	12/29	26	5.2	10.3	4.8
MAVERICK FORK SNOTEL	9200	1/1	--	6.3	10.5	4.6**
McNary	7225	DISCONTINUED			1.3	
MCNARY SNOTEL	7225	DISCONTINUED				
Milk Ranch	7000	DISCONTINUED				
Mt. Ord (A)	11000	DISCONTINUED				
Nutrioso *	8500	1/5	5	1.9	2.8	1.5E
Promontory Butte	7900	12/29	22	7.8	11.9E	5.3**
PROMONTORY SNOTEL	7900	1/1	--	9.2	---	5.1**
Smith Cienega (A)	9850	DISCONTINUED				
Sunrise Summit	10600	DISCONTINUED				
Wilson Lake	9000	DISCONTINUED			7.6	
Workman Creek	6900	LATE REPORT			5.5	4.0E
WORKMAN CREEK SNOTEL	6900	1/1	--	1.1	3.8	3.7E
LOWER COLORADO RIVER						
Bill Williams Intermediate	8550	DISCONTINUED				
Bill Williams Summit	8950	DISCONTINUED				
Chalender *	7100	12/29	2	0.4	1.6	1.5**
Fort Valley	7350	12/29	3	0.6	3.4	0.8E
Grand Canyon	7500	LATE REPORT			1.7	1.0E
Williams Ski Run	7720	NO SURVEY			6.4	3.5E
Bright Angel	8400	12/29	20	5.4	10.2	---

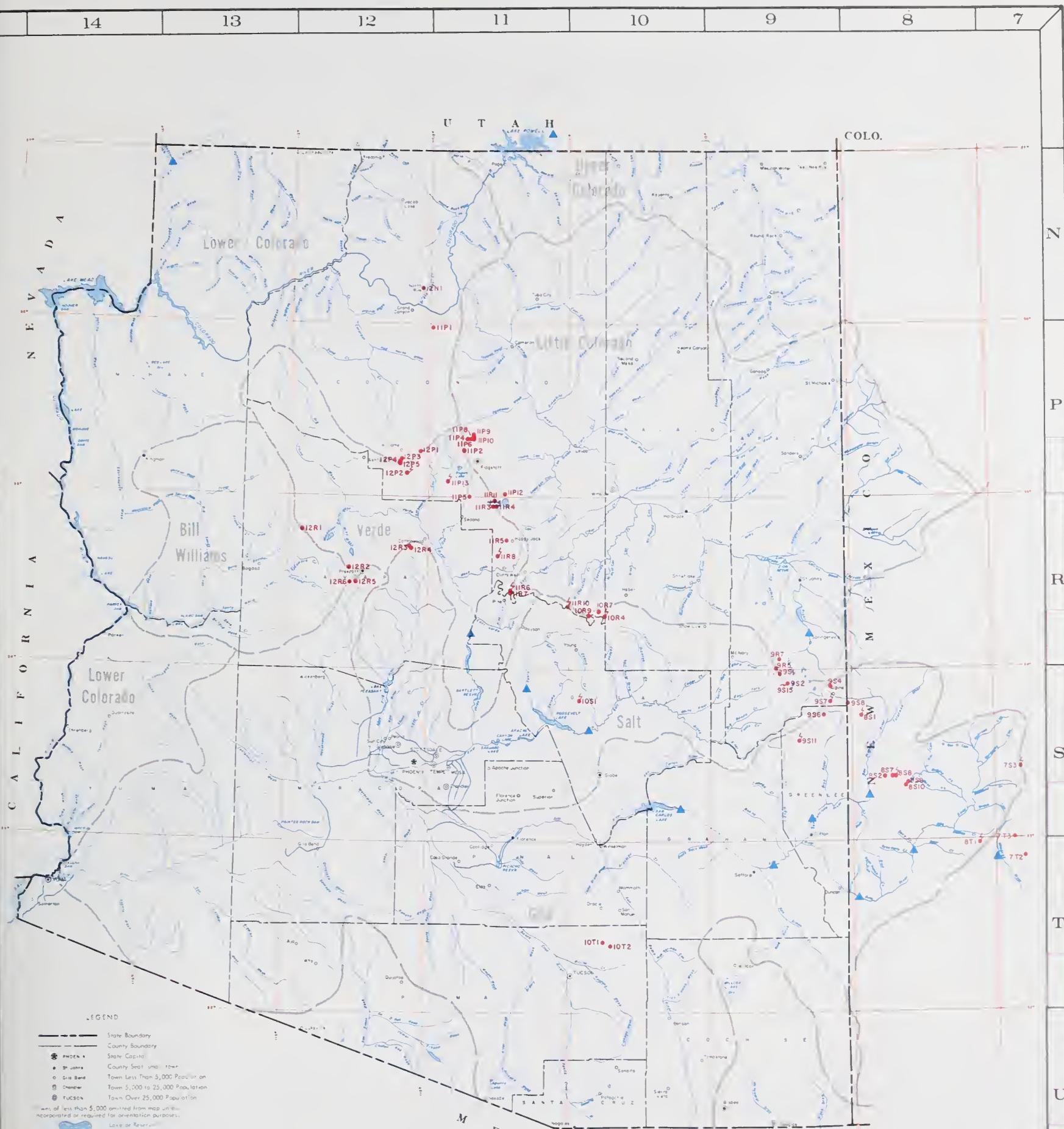
+ 1961-80 20-year period. (*) Adjacent drainage. (**) 1961-80 Adjusted Average. (A) Aerial observation: water content estimated. Snotel data is edited. (E) Estimated.

SNOW ABOUT JANUARY 1, 1984

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR			PAST RECORD	
		Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	Last Year
NAME	Elevation					Average +
LITTLE COLORADO RIVER						
Baldy	9220	12/29	22	4.9	7.2	4.0
BALDY SNOTEL	9220	1/1	--	5.5	8.3	4.4**
Canyon Creek	7500	12/28	8	1.8	3.7	2.5
Canyon Point	7600	12/28	8	1.5	4.1	2.5**
Cheese Springs	8600	12/29	14	2.9	3.8	2.0E
Forest Dale Alternate	6580	12/29	1	0.2	0.2	1.0E
Ft. Apache	9160	12/29	23	4.9	7.1	4.3E
Fort Valley	7350	12/29	3	0.6	3.4	0.8E
Happy Jack	7630	12/29	9	3.4	4.8	2.1
Heber	7640	12/28	8	2.6	3.9	1.9
HEBER SNOTEL	7640	1/1	--	3.8	3.4	2.3**
Lake Mary	6970	12/29	1	0.2	3.1	1.2**
McNary	7225	DISCONTINUED				
MCNARY SNOTEL	7225	DISCONTINUED				
Mormon Lake	7350	12/29	5	1.8	3.8	3.0E
Mormon Mountain	7500	12/29	11	4.9	5.9	3.8**
MORMON MOUNTAIN SNOTEL	7500	1/1	--	2.9	6.2	4.1
Mormon Mountain Summit #2	8470	NOT SCHEDULED			---	---
Nutrioso*	8500	1/5	5	1.9	2.8	1.5E
Promontory Butte	7900	12/29	22	7.8	11.9E	5.3**
PROMONTORY SNOTEL	7900	1/1	--	9.2	---	5.1**
Snow Bowl #1 Alternate	9920	12/29	30	7.4	11.0	5.0E
Snow Bowl #2	11000	12/29	38	9.5	15.6	7.4E
Wilson Lake	9000	DISCONTINUED				

+ 1961-80 20-year period. (*) Adjacent drainage. (**) 1961-80 Adjusted Average. (A) Aerial observation: water content estimated. Snotel data is edited.

PRECIPITATION (Inches) JANUARY 1, 1984 (SNODEL SITES)



SNOW COURSES AND RELATED DATA MEASURING SITES

ARIZONA

1984

INDEX TO SNOW COURSES

NUMBER	NAME	SEC.	TWP.	RGE.	ELEV.	DRAINAGE	OBSERVER	RECORD BEGAN
11P10A	Agassiz	32	23N	7E	11200	Little Colorado	SCS-CF*	1968
11R6PSPRT	Baker Butte	4	12N	9E	7300	Verde	SCS	1966
11R7	Baker Butte #2	9	12N	9E	7700	Verde	SCS	1971
9S1APSPRT	Baldy	28	7N	27E	9125	Little Colorado	SCS	1950
9S15	Baldy #2	12	6N	26E	9750	Little Colorado	SCS	1963
10T1	Bear Wallow	6	12S	16E	8100	Gila	FS	1948
9S6	Beaver Head	13	4N	30E	8000	San Francisco	FS	1938
12P5	Bill William Intermediate	17	21N	2E	8550	Cataract	FS	1967
12P4	Bill Williams Summit	17	21N	2E	8950	Verde	FS	1967
12N1	Bright Angel	34	33N	3E	8400	Bright Angel Creek	NPS	1947
12R1	Camp Wood	3	16N	6W	5700	Verde	FS	1946
10R7	Canyon Creek #2	18	11N	15E	7500	Little Colorado	SCS	1958
10R9P	Canyon Point	28	11N	14E	7600	Salt	SCS	1967
12P1	Chalender	27	22N	3E	7100	Verde	FS	1947
9R7	Cheese Springs	28	8N	27E	8600	Little Colorado	SCS	1969
12R6P	Copper Basin Divide	23	13N	3W	6720	Verde	SCS	1963
9S7PSPRT	Coronado Trail	26	5N	30E	8000	San Francisco	FS	1938
7T2	Emory Pass #2	16	16S	9W**	7800	Mimbres	SCS	1967
11P13PSPRT	Fry	35	20N	5E	7220	Verde	SCS	1978
9R5	Ft. Apache	18	7N	27E	9160	Little Colorado	SCS	1951
11P2P	Ft. Valley	22	22N	6E	7350	Little Colorado	FS	1947
8S1PSPRT	Frisco Divide	31	6S	20W**	8000	San Francisco	FS	1938
12R4	Gaddes Canyon	11	15N	2E	7600	Verde	SCS	1954
11P1	Grand Canyon	21	30N	4E	7500	Hance Creek	NPS	1947
9S11PSPRT	Hannagan Meadows	19	3N	29E	9090	San Francisco	FS	1964
11R5P	Happy Jack	30	16N	9E	7630	Verde	FS	1951
10R4PSPRT	Heber	28	11N	15E	7600	Little Colorado	SCS	1950
8S9A	Hummingbird	19	11S	17W**	10550	Gila	SCS	1964
11P9P	Inner Basin #1	28	23N	7E	10000	Little Colorado	SCS-CF*	1967
11P8P	Inner Basin #2	28	23N	7E	9750	Little Colorado	SCS	1967
12R2	Iron Springs	22	14N	3W	6200	Little Colorado	SCS	1946
11P12	Lake Mary	21	19N	9E	6930	Little Colorado	SCS	1975
7S3PSPRT	Lookout Mountain	1	10S	10W	8500	Gila	SCS	1978
9S2APSPRT	Maverick Fork	13	6N	27E	9150	Salt	SCS	1950
7T3A	McKnight Cabin	10	15S	10W**	9300	Mimbres	SCS	1967
12R3	Mingus Mountain	3	15N	2E	7100	Verde	SCS	1947
8S2	Mogollon	2	11S	19W**	7000	San Francisco	SCS	1953
11R4	Mormon Lake	13	18N	8E	7350	Little Colorado	SCS	1947
11R3APSPRT	Mormon Mountain	14	18N	8E	7500	Verde	SCS	1950
11R11	Mormon Mountain Summit #2	2	18N	8E	8470	Little Colorado	SCS	1975
11P5	Newman Park	25	19N	6E	6750	Verde	SCS	1963
9S4	Nutrioso	23	6N	30E	8500	San Francisco	FS	1938
11R10PSPRT	Promontory Butte	5	11N	13E	7930	Little Colorado	SCS	1973
8S7	Redstone Trail	5	11S	18W**	8600	San Francisco	SCS	1961
10T2	Rose Canyon	15	12S	16E	7300	Gila	FS	1948
8T1PSPRT	Signal Peak	13	16S	13W	8360	Gila	SCS	1977
8S8PSPRT	Silver Creek Divide	4	11S	18W**	9000	San Francisco	SCS	1964
11P4	Snow Bowl #1	36	23N	6E	10260	Verde	FS	1961
11P6	Snow Bowl #2	31	23N	7E	11000	Verde	FS	1965
9S8	State Line	6	6S	21W**	8000	San Francisco	FS	1938
11R8PSPRT	Sugarloaf	8	8E	14N	6120	Verde	SCS	1978
12P2PSPRT	White Horse Lake Jct.	2	20N	2E	7180	Verde	FS	1967
12R5	White Spar	19	13N	2W	6000	Verde	SCS	1963
8S10A	Whitewater	19	11S	17W**	10750	Gila	SCS	1964
12P3	Williams Ski Run	9	21N	2E	7720	Cataract	FS	1967
10S1PSPRT	Workman Creek	33	6N	14E	6900	Salt	FS	1952

A Aerial Snow Depth Marker

SP Snow Pressure Pillow

P Precipitation Storage Gage

T Temperature

R Radio Telemetry (SNOWTEL)

** NM Principal Meridian

* City of Flagstaff

***The Following Organizations Cooperate
in the Arizona Snow Survey Work***

FEDERAL

Department of Agriculture
Soil Conservation Service
Forest Service
 Apache-Sitgreaves Forest
 Coconino Forest
 Coronado Forest
 Gila Forest
 Kaibab Forest
 Prescott Forest
 Rocky Mountain Forest and Range
 Experiment Station
 Tonto Forest
Department of Commerce
 NOAA, National Weather Service
Department of Interior
 Bureau of Reclamation
 Region III
 Geological Survey
 Arizona District
 New Mexico District
 Bureau of Indian Affairs
 San Carlos Irrigation Project
 National Park Service
 Grand Canyon National Park
Gila Water Commissioner
 Safford, Arizona

STATE

Arizona Game and Fish Department
Arizona State Parks Board
Arizona Department of Water Resources
University of Arizona
 Arizona Agricultural Experiment Station
 Water Resource Research Center
 Department of Watershed Management

Arizona State Climatologist

MUNICIPAL

City of Flagstaff

IRRIGATION PROJECTS
Salt River Valley Water Users' Association
 Phoenix, Arizona
San Carlos Irrigation and Drainage District
 Coolidge, Arizona
Maricopa County Municipal Water Conservation District
 Peoria, Arizona

PRIVATE

Southwest Forest Industries, Inc.
 Phoenix, Arizona

Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FEDERAL BUILDING ROOM 3008
230 NORTH FIRST AVENUE
PHOENIX, ARIZONA 85025

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domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*